REMARKS

Reconsideration and further examination is respectfully requested.

Rejections under 35 U.S.C. §102

Claims 17 was rejected under 35 U.S.C. §102(e) as being anticipated by Ericsson, Martin van der Zee, (hereafter Zee) July, pages 1-54. Claim 17 was also rejected under 35 U.S.C.§102(e) as being anticipated by Tappan, U.S. Patent 6,473,421.

Zee

Zee is a state of the art report on QoS routing. The Examiner points to various places in Zee as teaching various elements of the invention. In particular, the Examiner states:

"... Zee discloses an information base including an entry correlating a first label (AL1) from a first ("autonomous") system (e.g. A) to a second label (BLI) in a second ("autonomous") system (e.g. B) (see figure 6 and table 3 on pages 31-32). Inter-domain or exterior routing protocols (BGP or IDRP) are used to exchange routing information between autonomous system AS (section 3.4 on page 9-10), MPLS uses routing protocol BGP with label swapping paradigm (section 5.1.1). LSR router (Fig. 4 on page 12) contains a label map for mapping an incoming label to an outgoing label. LSR edge routers (Fig. 5) are routers with LSR functionality (page 21)..."

Claim 17 of the invention as amended recites "An information base comprising at least one entry mapping a first label corresponding to a last hop FEC of a first autonomous system to a second label corresponding to a first hop FEC in a second autonomous system..."

Applicants note that, with regard to inter-domain labels, Zee describes, at the last paragraph of page 29:

"... For each FEC there is an associated list of procedures, the router will perform on the corresponding packet... An LSR router examines the label of incoming packets, determines the

FEC, executes the associated procedures and queue the packet in the designated output queue. This process is repeated by each intermediate LSR, until the packet reaches the egress LER, *where the label information is removed...*" Such description neither discloses or suggests a database which maps labels from received at an egress to labels associated at an ingress, but rather hints that labels are, in fact, removed and not used across AS boundaries.

At page 30, section 5.1.7, Zee states that "... The distribution of label bindings in the network, can be done with a Label Distribution Protocol (LDP). The Label Distribution Protocol allows the construction of Label Switched Paths (LSPs) within the MPLS domain. However, at page 28, figure 4, Zee clearly shows that an MPLS domain is bounded by edge routers (LER A, LER B, LER C). Accordingly, the only interpretation that can be made of the teachings of Zee is that MPLS label distribution *does not* extend across autonomous systems.

With regard to the MPLS Forwarding Information Base (FIB), Applicant notes that the information forwards packets *within* a single MPSL domain. The FIB does not include mapping data for "mapping a first label from a first autonomous system to a second label in a second autonomous system" as recited in claim 17. Accordingly, claim 17 is patentably distinct over Zee, which fails to disclose the limitations of the claims.

Tappan

Tappan describes, in the abstract:

"... In a communications-networking autonomous system consisting of an OSPF domain, autonomous-system border routers (I-ASBR and E-ASBR) cause exchange of hierarchical forwarding labels whose hierarchies are based on OSPF areas. A border router transmits into the domain an OSPF LSA Update message containing an AS-External LSA whose External Route Tag field other routers interpret as specifying a label to be used for forwarding. When that LSA is flooded into the OSPF domain, area border routers respond by flooding new LSAs created from the received one by replacing the label contained in the External Route Tag field with labels that specify their forwarding tables' locations containing information for forwarding to the originating

autonomous system border router. In so doing, they enable packets destined for an extra-domain location to be forwarded through the autonomous system without requiring non-border routers to allocate labels to the exterior location or to border routers outside their areas. This enables a networking backbone to conserve its label space even though it carries a large variety of external traffic..."

Applicant refers the Examiner to Figure 6, which illustrates an autonomous system 44 interfacing with a source and destination node through border routers I-ASBR and E-ASBR. Figure 6 illustrates how the egress border router (E_ASBR) forwards label information to *every* one of the internal routers (label T3), to provide labels for any communication with devices that are externally coupled to the AS 44 through E_ASBR. Label stacking is used to control flow of the source routed packet from ingress border router to the egress border router. Applicant further notes that Tappan does not disclose a label switched path which spans autonomous system boundaries, but rather a method of distributing labels within an autonomous system.

In contrast, claim 17 of the present invention, as amended, now recites "...An information base comprising at least one entry mapping a first label corresponding to a last hop FEC of from a first autonomous system to a second label corresponding to a first hop FEC in a second autonomous system...."

Tappan shows no such structure. In Tappan, neither of the border routers (I-ABSR and E-ABSR) include a table for mapping a first label associated with a last hop FEC of one autonomous system with a second label associated with a first hop FEC of another autonomous system. Tappan shows only how labels to egress routers are forwarded *within* the AS, so that they may be used for label stacking within the AS.

Accordingly, for at least the reason that Tappan neither describes nor suggests the limitations of the present invention, the rejection of claim 17 has been overcome and should be withdrawn.

Rejections under 35 U.S.C. §103

Claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over MPLS Study, Project Competence Center for ATM Components, Roth et. al., Research Institute of Open Communication Systems, pages 1-42 (referred to as Roth hereafter) in view of Tappan, U.S. Patent No. 6,473,421.

Claims 1-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over MPLS Study Project: Competence Center for ATM Components, Rothe et. al., Research Institute of Open Communication Systems, pages 1-42 (referred to as Roth hereafter) in view of Network Working Group Internet Draft (NMID), Rosen, E. et. al., Aug. 1997, pages 1-59 (Rosen hereafter).

Roth:

Roth describes, at page 4 "... The basic idea for MPLS is to add short fixed length labels to IP packets that can be used by the forwarding engines *in the network* to simplify packet forwarding. This provides a convenient means to base packet forwarding on other criteria besides the destination only of the traditional IP networks...." (Emphasis added) Roth, in this passage, describes the use of label within systems, but not across autonomous systems.

Roth further describes, at page 5, paragraph 4 "... In general, one distinguishes between two types of routing: the routing between administrative domains and the routing within a single routing domain. *Interdomain routing is mainly based on policy decisions.* The routing policy defines which traffic a ISP will allow to transit the routing domain and depends on mutual peering agreements between adjacent providers. The intradomain routing constructs paths to

either end-node for traffic terminating within the domain or paths to an egress router for transit traffic. ...."

Roth further states, at page 10 paragraphs 4-6, in part: "... The basic idea of label switching is to optimize the process of FEC identification. Instead of repeating the same processing of header information at each hop, it is only performed at the ingress node, which encodes the FEC information into a small fixed length label that is added to the IP packet, such that subsequent nodes can base their forwarding decision on the packet label only without further need for complex header analysis.... In this way effectively a virtual connection is established for each FEC into the domain creating a forwarding trunk from ingress router to egress router analogous to the ATM VCCs set up in an ATM switched network core...."

Thus Roth, similar to Tappan and Zee, neither describes nor suggests applying label switching *across* autonomous systems, as recited in the claims of the present invention. As such, the combination of Tappan and Roth neither describe or suggests the limitations of claim 1, which recites "...storing, in a memory at a border router coupling a first autonomous system to a second autonomous system, *a mapping of a first label associated with a last hop forwarding equivalency class (FEC) of the from a first autonomous system to a second label associated with a first hop in the FEC in the a second autonomous system* ... receiving from said first autonomous system a protocol message including said first label ... replacing said first label with said second label in said protocol message; and ... forwarding said protocol message to a downstream neighboring (next hop) device in said second autonomous system..."

For at least the reason that the references, in combination, neither disclose nor suggest the claimed invention, the rejection is overcome and should be withdrawn.

As mentioned above, claims 1-16 were also rejected under the combination of Roth in view of Network Working Group Internet Draft (NWID), Rosen, E. et. al, Aug. 1997, pages 1-59 (Rosen).

The Examiner states, at page 5 of the office action "Roth does not explicitly teach where the border router support inter-domain routing protocol for communicating between autonomous systems are label switching capable.... Rosen discloses a protocol architecture for multi-protocol label switching (MPLS) ... including an MPLS edge node as an MPLS node that connects an MPLS domain with a node in a different domain .... Wherein an MPLS domain is a group of nodes which operate MPLS routing and are one routing or Administrative domain... It would have been obvious to one of ordinary skill in the art at the time the invention was made that the border router supporting intercommunication between autonomous system discussed in Roth reference are label switching capable as exemplified by Roth..."

Applicants disagree that the combination of references would teach or describe the claimed invention. As discussed by the Examiner, Roth describes the use of the BGP protocol for inter-domain routing. Rosen describes MPLS *within* a domain, but *not* across domain boundaries. For at least the reason that the combination of references fails to describe or suggest the limitations of claim 1, which recite "..., *a mapping of a first label associated with a last hop forwarding equivalency class (FEC) of the from a first autonomous system to a second label associated with a first hop in the FEC in the a second autonomous system...*" the rejection of claim is overcome and should be withdrawn.

Dependent claims 2-5 depend on claim 1, serve to add further patentable limitations to claim 1 and are allowable for at least the reasons put forth above with regard to claim 1.

Independent claim 6 recites "...A border router device for establishing a label switched path across multiple autonomous systems, the device comprising ... mapping logic operably coupled to map a first label associated with a last hop forwarding equivalency class (FEC) of ~~from~~ a first autonomous system to a second label associated with a first hop in the FEC in a second autonomous system..." Independent claim 11 recites a program product having logic similar to that of claim 6. As described above with regard to claim 1, Tappan fails to disclose a mapping process similar to that of claims 6 and 11, which provide label mapping between a last hop FEC of a first AS and a first hop FEC of a second AS. For at least this reason, claims 6 and 11 are patentably distinct over any combination of Tappan, Roth, Rosen or other references cited by the Examiner. Dependent claims 7-10 and 12-15 serve to add further patentable limitations to their parent independent claims and are therefore allowable for at least the same reasons as the independent claims. It is respectfully requested that the rejection of claims 1-15 be withdrawn.

Conclusion

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Lindsay McGuinness, Applicants' Attorney at (978) 264-6664 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

Lindsay McGuinness, Reg. No. 38,549
Attorney/Agent for Applicant(s)
Steubing, McGuinness & Manaras LLP
30 Nagog Park Drive
Acton, MA 01720
(978) 264-6664

Attorney Docket No.: 2204/150 120-046
Date: 1/31/2005
dd: